FIG.1

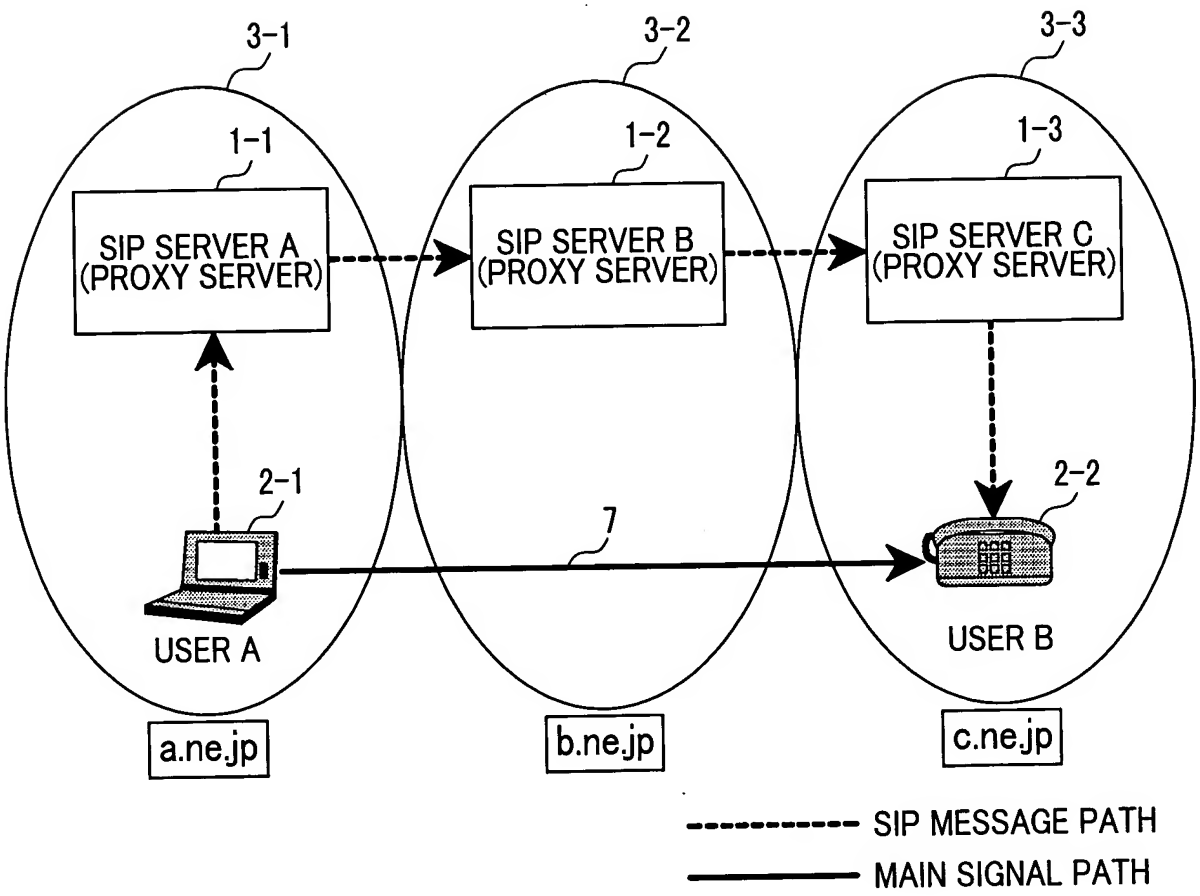

3-1
3-2
3-3
1-1
1-2
1-3
SIP SERVER A
(PROXY SERVER)
SIP SERVER B
(PROXY SERVER)
SIP SERVER C
(PROXY SERVER)
2-1
2-2
7
USER A
USER B
a.ne.jp
b.ne.jp
c.ne.jp
SIP MESSAGE PATH
MAIN SIGNAL PATH

FIG.2

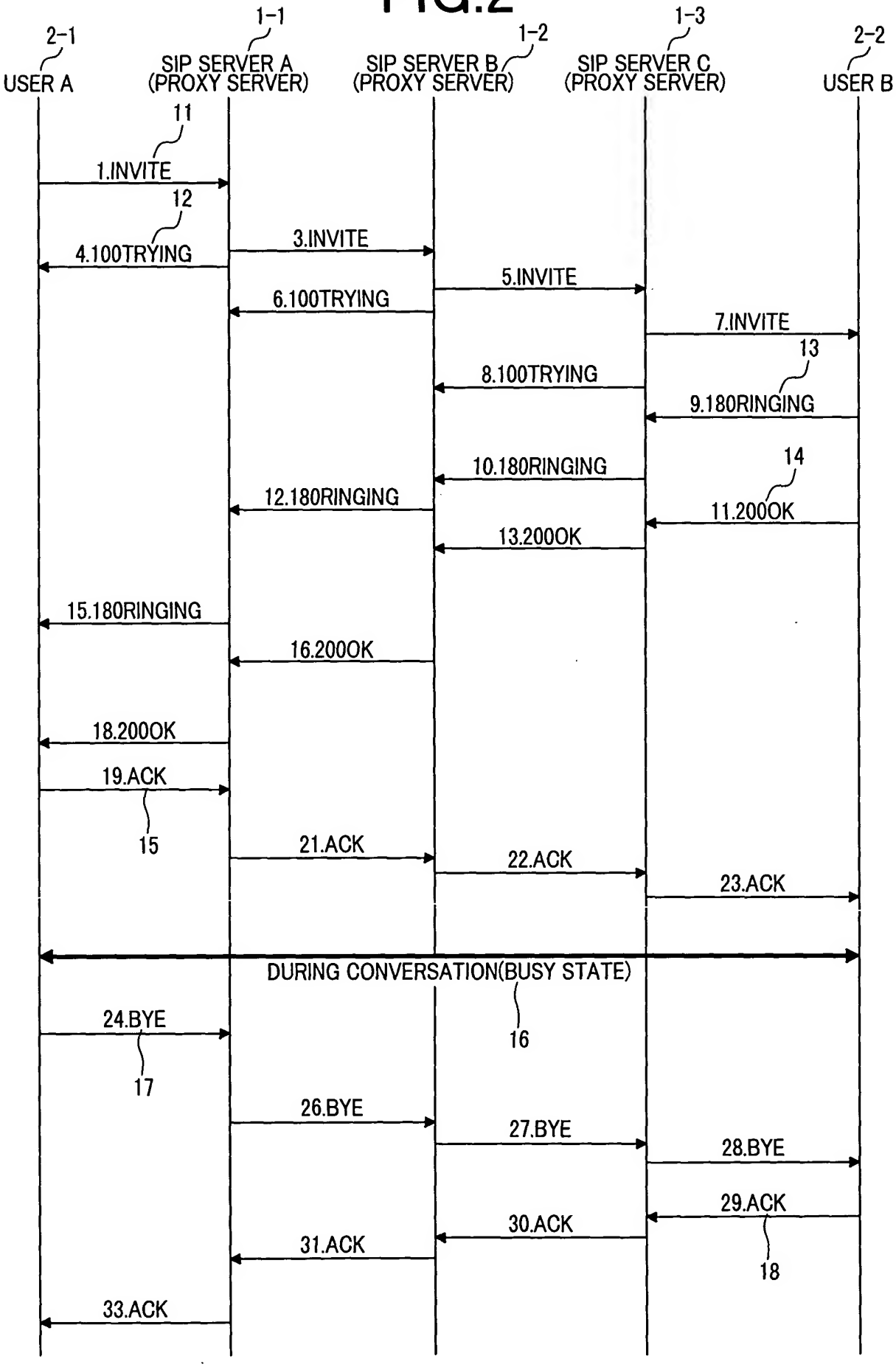

2-1
USER A
1-1
SIP SERVER A
(PROXY SERVER)
1-2
SIP SERVER B
(PROXY SERVER)
1-3
SIP SERVER C
(PROXY SERVER)
2-2
USER B
11
1.INVITE
12
4.100TRYING
3.INVITE
5.INVITE
6.100TRYING
7.INVITE
13
8.100TRYING
9.180RINGING
10.180RINGING
14
12.180RINGING
11.200OK
13.200OK
15.180RINGING
16.200OK
18.200OK
19.ACK
15
21.ACK
22.ACK
23.ACK
DURING CONVERSATION(BUSY STATE)
16
24.BYE
17
26.BYE
27.BYE
28.BYE
29.ACK
30.ACK
18
31.ACK
33.ACK

FIG.3

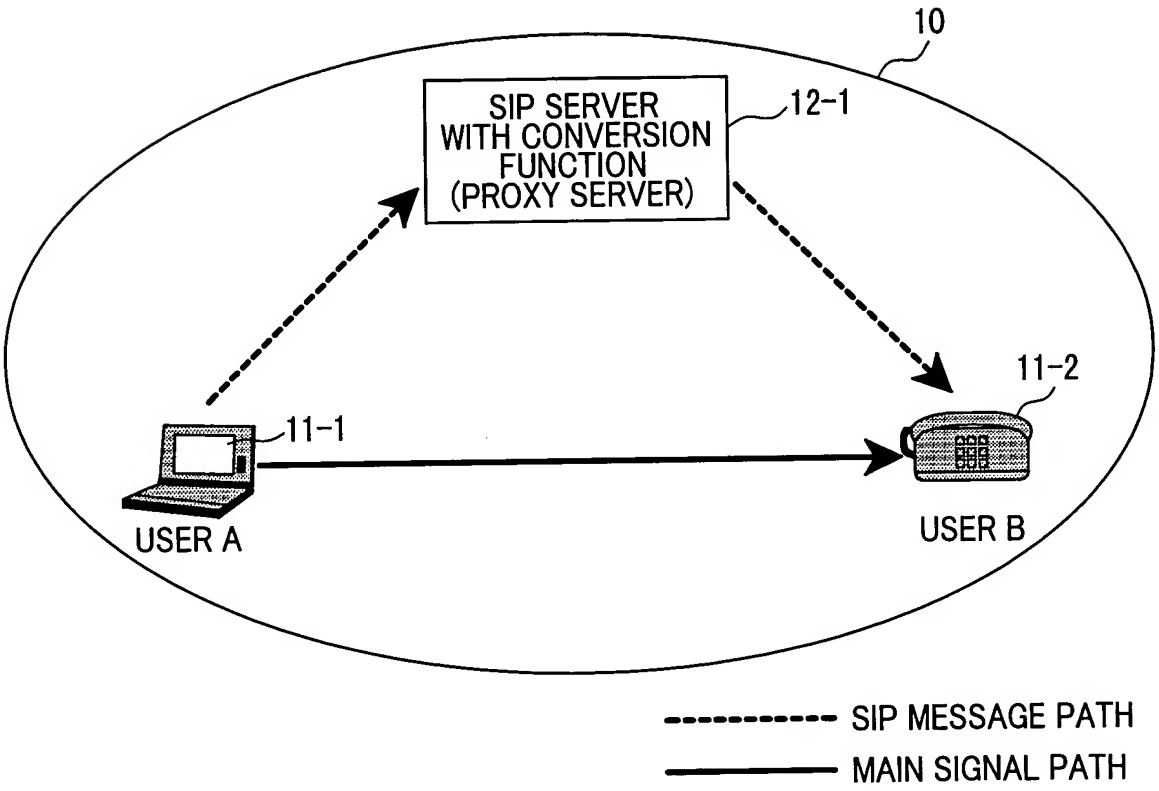

10
SIP SERVER WITH CONVERSION FUNCTION (PROXY SERVER)
12-1
11-2
11-1
USER A
USER B
SIP MESSAGE PATH
MAIN SIGNAL PATH

FIG.4

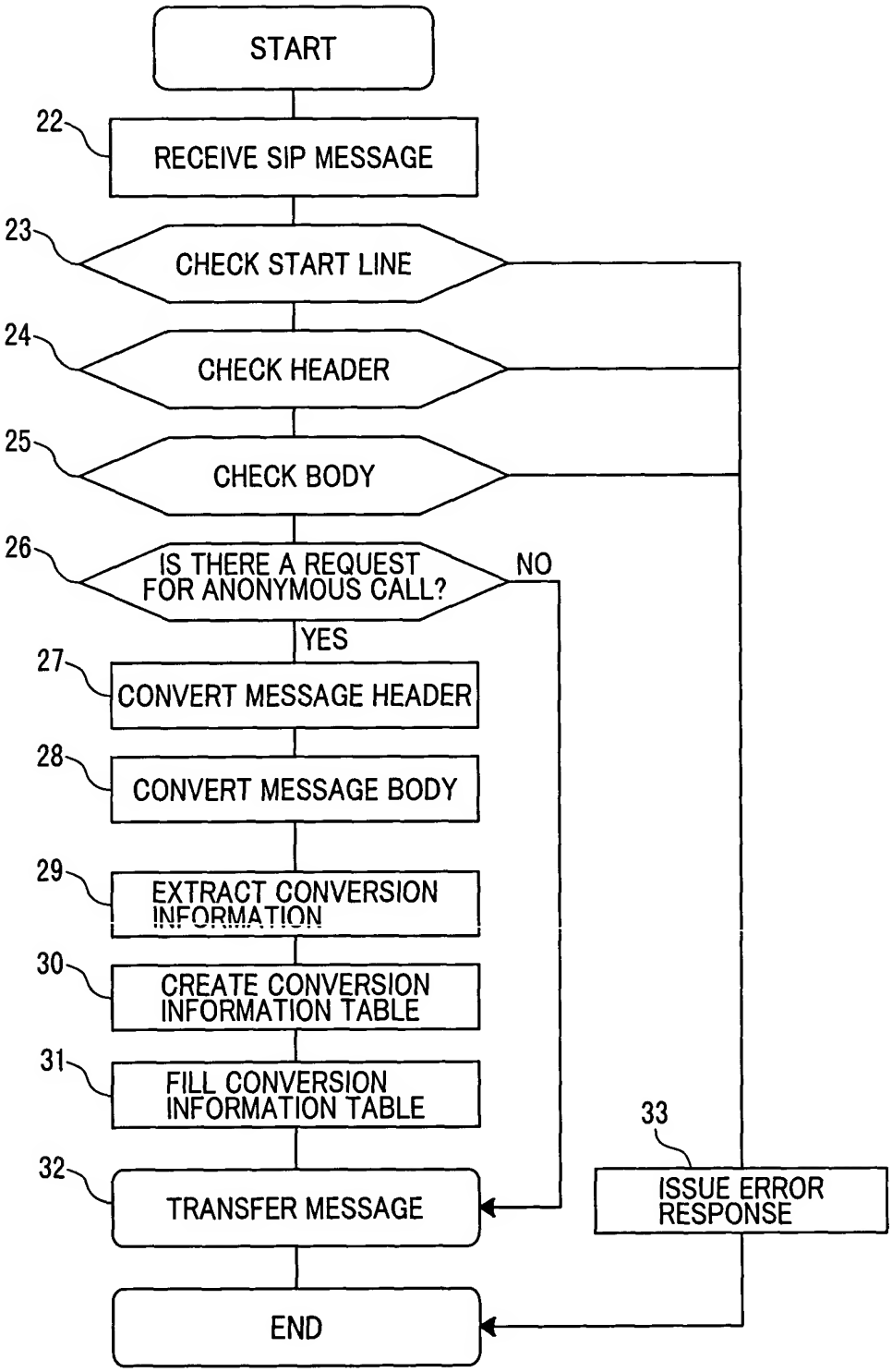

START
22
RECEIVE SIP MESSAGE
23
CHECK START LINE
24
CHECK HEADER
25
CHECK BODY
26
IS THERE A REQUEST FOR ANONYMOUS CALL?
NO
YES
27
CONVERT MESSAGE HEADER
28
CONVERT MESSAGE BODY
29
EXTRACT CONVERSION INFORMATION
30
CREATE CONVERSION INFORMATION TABLE
31
FILL CONVERSION INFORMATION TABLE
32
TRANSFER MESSAGE
33
ISSUE ERROR RESPONSE
END

FIG.5

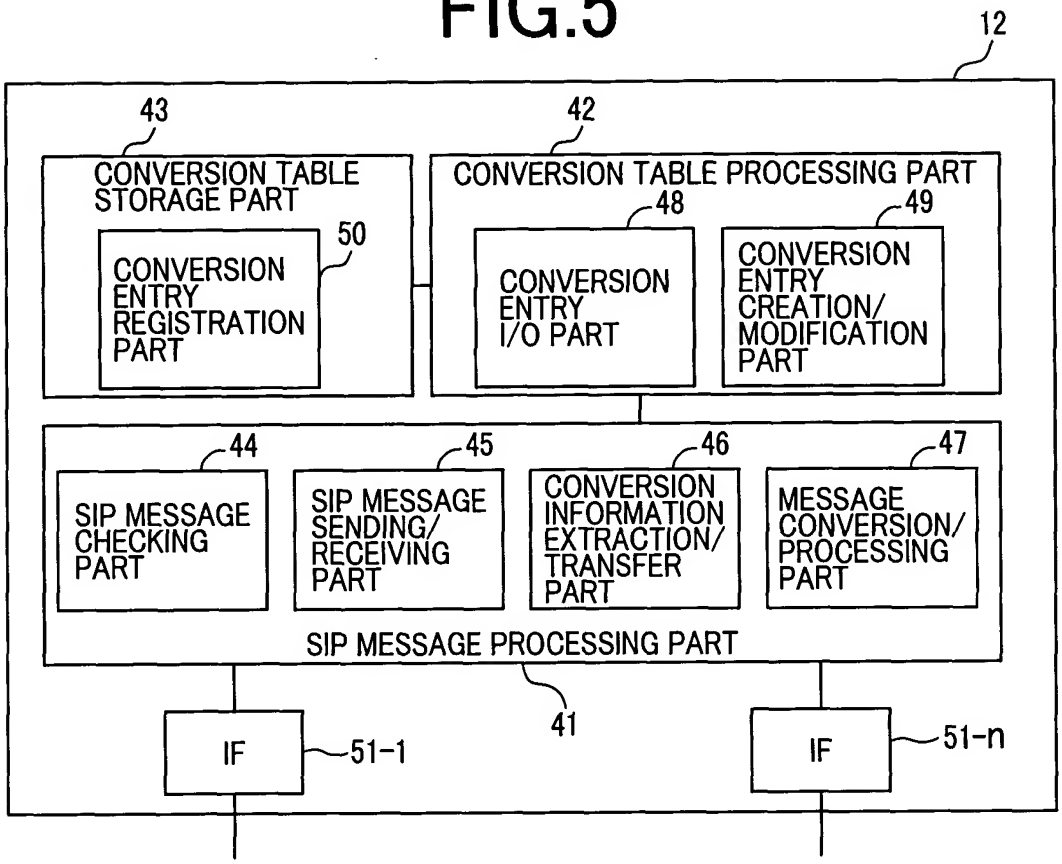

12
43
42
CONVERSION TABLE STORAGE PART
50
CONVERSION ENTRY REGISTRATION PART
CONVERSION TABLE PROCESSING PART
48
CONVERSION ENTRY I/O PART
49
CONVERSION ENTRY CREATION/ MODIFICATION PART
44
45
46
47
SIP MESSAGE CHECKING PART
SIP MESSAGE SENDING/ RECEIVING PART
CONVERSION INFORMATION EXTRACTION/ TRANSFER PART
MESSAGE CONVERSION/ PROCESSING PART
SIP MESSAGE PROCESSING PART
41
IF
51-1
IF
51-n

FIG.6

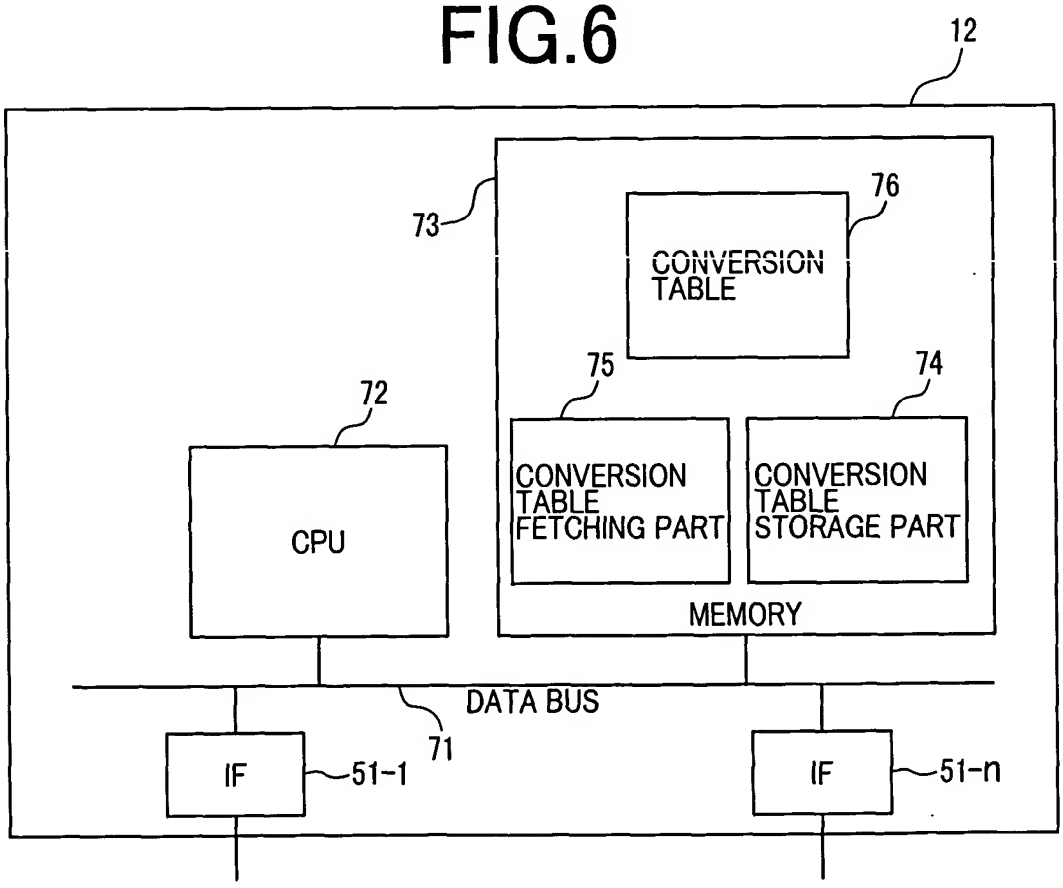

12
73
76
CONVERSION TABLE
75
74
72
CONVERSION TABLE FETCHING PART
CONVERSION TABLE STORAGE PART
CPU
MEMORY
DATA BUS
71
IF
51-1
IF
51-n

FIG.7

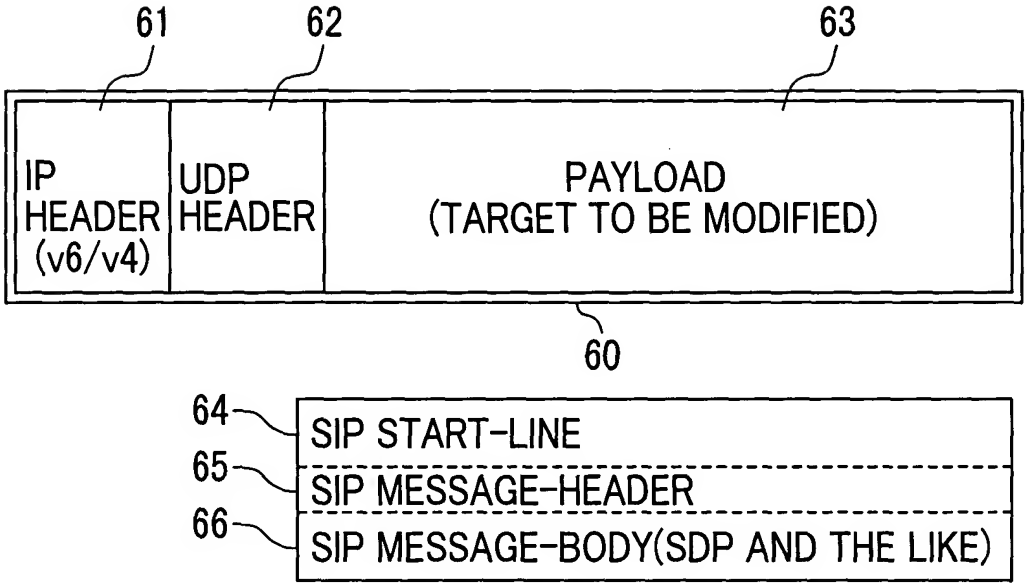

61
62
63
IP HEADER (v6/v4)
UDP HEADER
PAYLOAD (TARGET TO BE MODIFIED)
60
64
SIP START-LINE
65
SIP MESSAGE-HEADER
66
SIP MESSAGE-BODY(SDP AND THE LIKE)

FIG.8

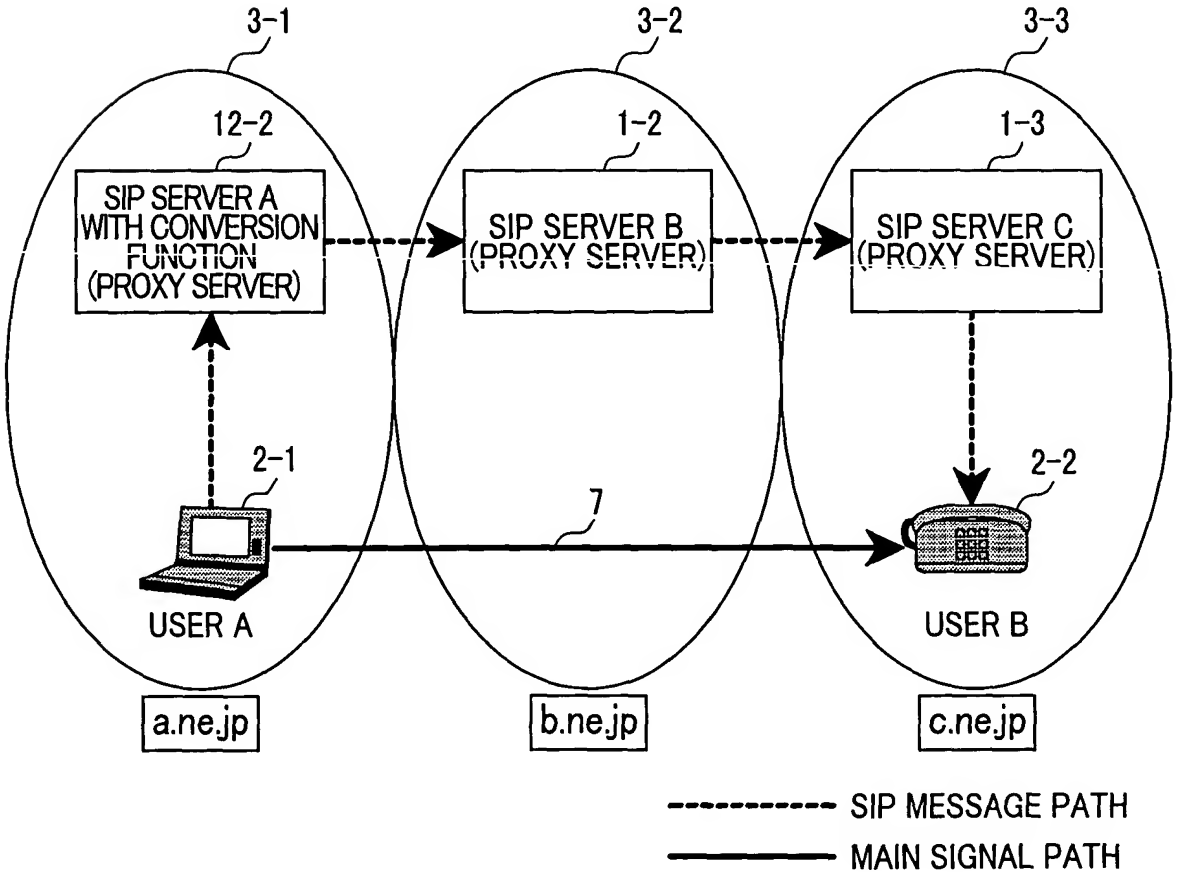

3-1
3-2
3-3
12-2
1-2
1-3
SIP SERVER A WITH CONVERSION FUNCTION (PROXY SERVER)
SIP SERVER B (PROXY SERVER)
SIP SERVER C (PROXY SERVER)
2-1
2-2
7
USER A
USER B
a.ne.jp
b.ne.jp
c.ne.jp
SIP MESSAGE PATH
MAIN SIGNAL PATH

FIG.9

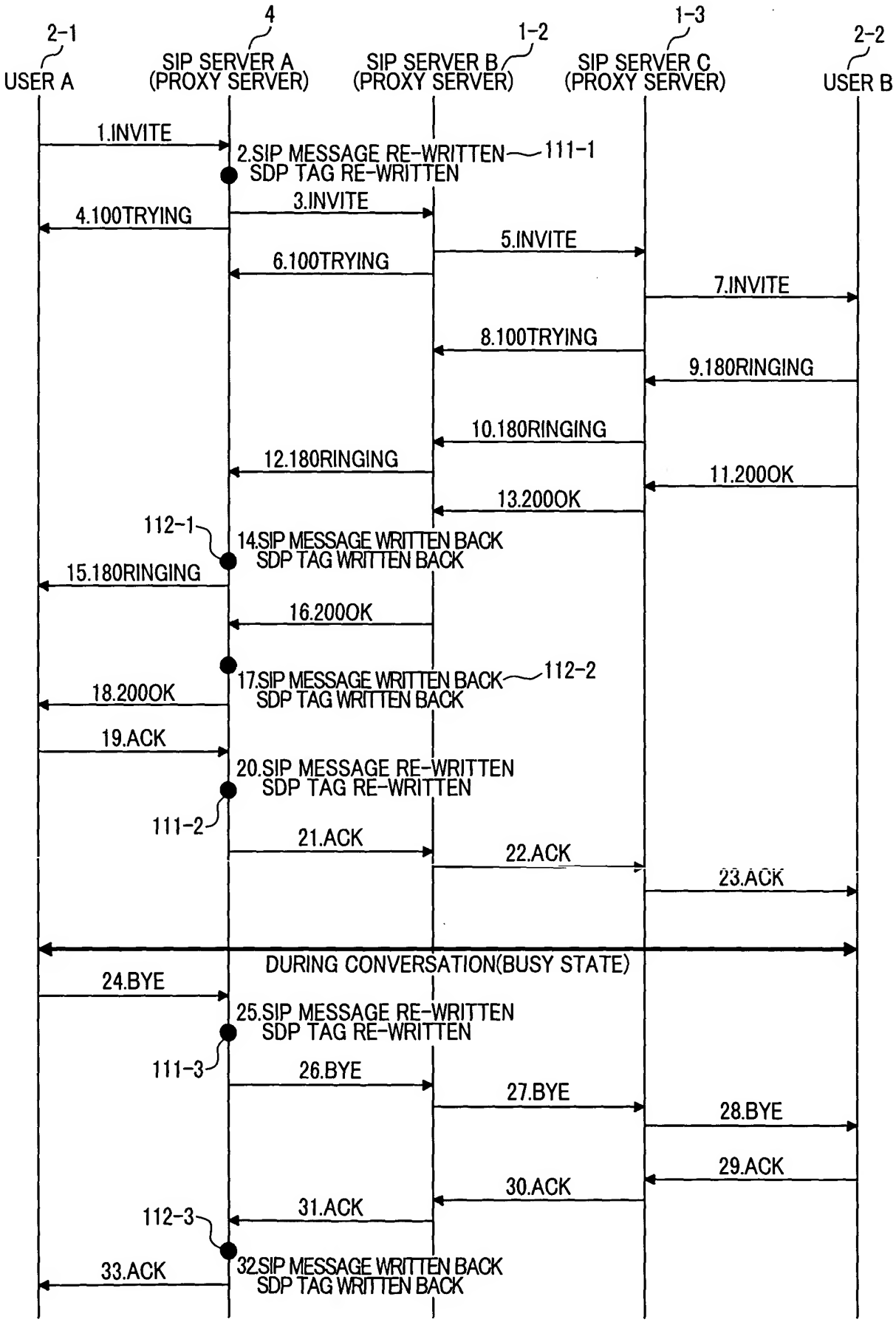

2-1
USER A
4
SIP SERVER A
(PROXY SERVER)
1-2
SIP SERVER B
(PROXY SERVER)
1-3
SIP SERVER C
(PROXY SERVER)
2-2
USER B
1.INVITE
2.SIP MESSAGE RE-WRITTEN
SDP TAG RE-WRITTEN
111-1
3.INVITE
4.100TRYING
5.INVITE
6.100TRYING
7.INVITE
8.100TRYING
9.180RINGING
10.180RINGING
12.180RINGING
11.200OK
13.200OK
112-1
14.SIP MESSAGE WRITTEN BACK
SDP TAG WRITTEN BACK
15.180RINGING
16.200OK
17.SIP MESSAGE WRITTEN BACK
SDP TAG WRITTEN BACK
112-2
18.200OK
19.ACK
20.SIP MESSAGE RE-WRITTEN
SDP TAG RE-WRITTEN
111-2
21.ACK
22.ACK
23.ACK
DURING CONVERSATION(BUSY STATE)
24.BYE
25.SIP MESSAGE RE-WRITTEN
SDP TAG RE-WRITTEN
111-3
26.BYE
27.BYE
28.BYE
29.ACK
30.ACK
31.ACK
112-3
32.SIP MESSAGE WRITTEN BACK
SDP TAG WRITTEN BACK
33.ACK

FIG.10

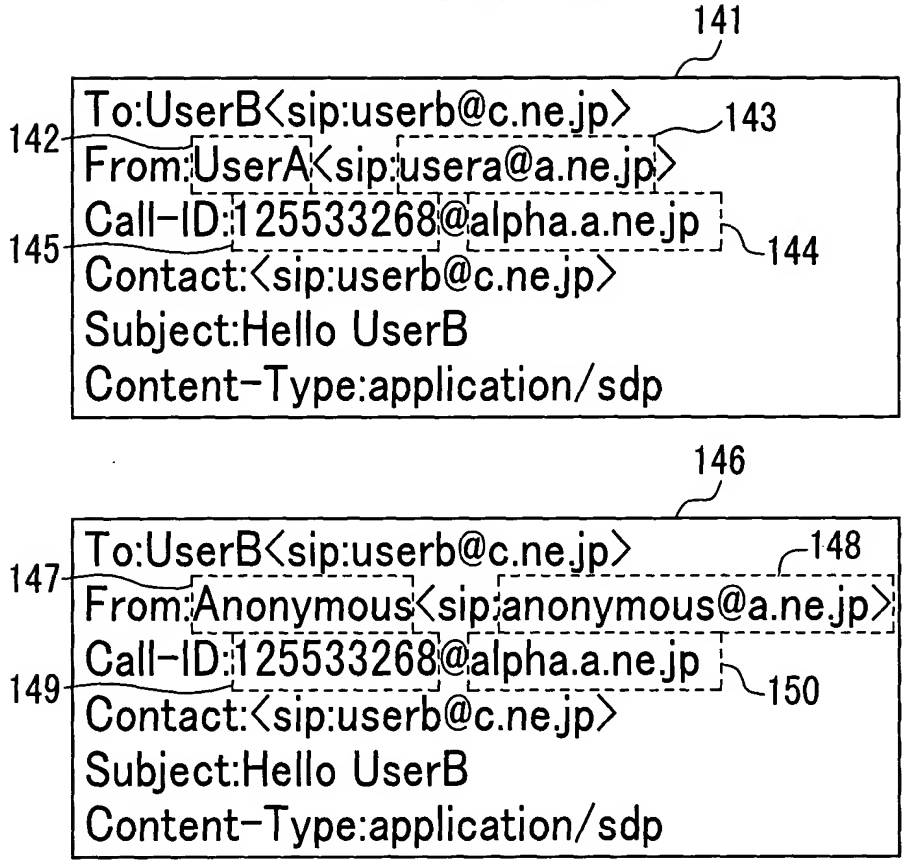

141
To:UserB<sip:userb@c.ne.jp>
143
142
From:UserA<sip:usera@a.ne.jp>
Call-ID:125533268@alpha.a.ne.jp
144
145
Contact:<sip:userb@c.ne.jp>
Subject:Hello UserB
Content-Type:application/sdp
146
To:UserB<sip:userb@c.ne.jp>
148
147
From:Anonymous<sip:anonymous@a.ne.jp>
Call-ID:125533268@alpha.a.ne.jp
150
149
Contact:<sip:userb@c.ne.jp>
Subject:Hello UserB
Content-Type:application/sdp

FIG.11

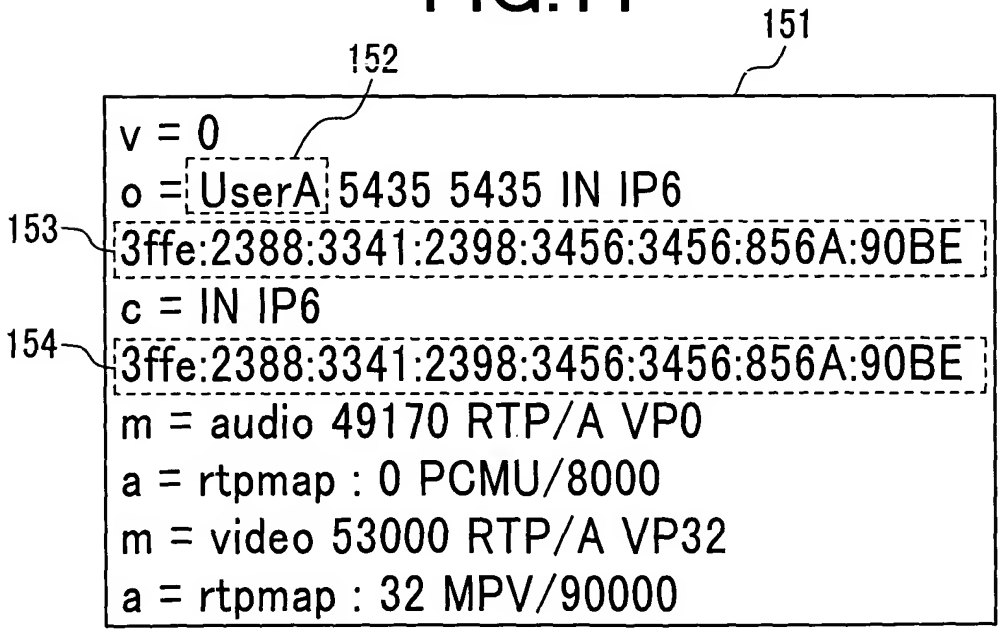

151
152
v = 0
o = UserA 5435 5435 IN IP6
153
3ffe:2388:3341:2398:3456:3456:856A:90BE
c = IN IP6
154
3ffe:2388:3341:2398:3456:3456:856A:90BE
m = audio 49170 RTP/A VP0
a = rtpmap : 0 PCMU/8000
m = video 53000 RTP/A VP32
a = rtpmap : 32 MPV/90000

FIG.12

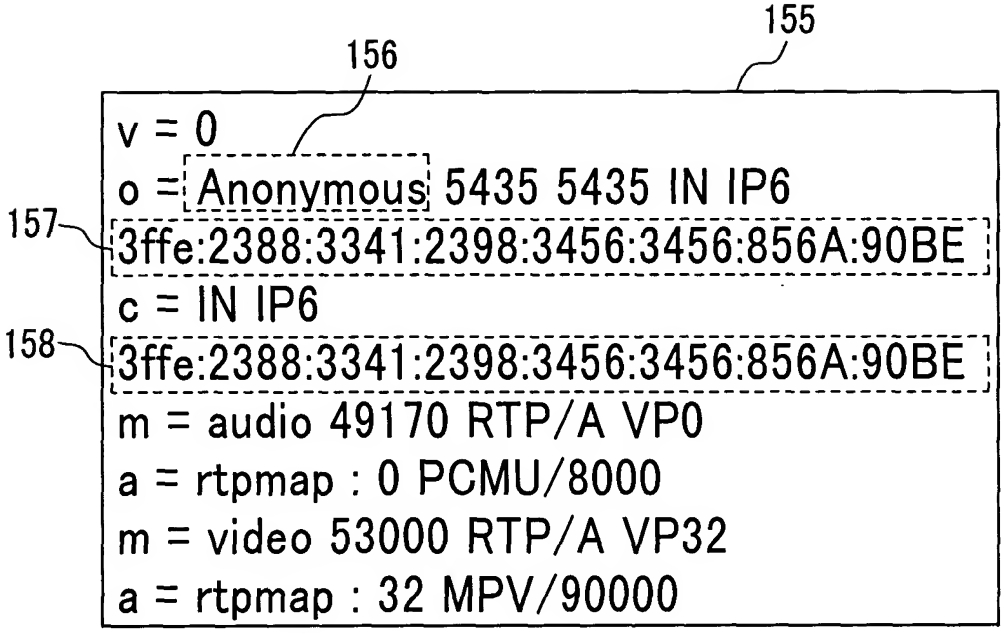

155
156
v = 0
o = Anonymous 5435 5435 IN IP6
157
3ffe:2388:3341:2398:3456:3456:856A:90BE
c = IN IP6
158
3ffe:2388:3341:2398:3456:3456:856A:90BE
m = audio 49170 RTP/A VP0
a = rtpmap : 0 PCMU/8000
m = video 53000 RTP/A VP32
a = rtpmap : 32 MPV/90000

FIG.13

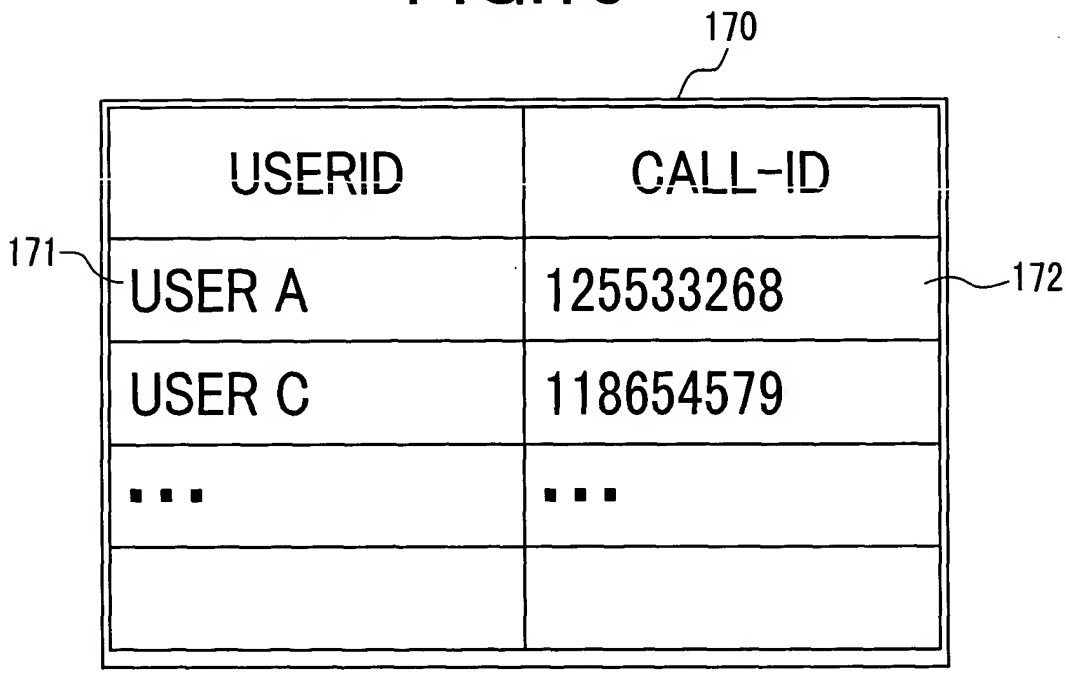

170
USERID
CALL-ID
171
USER A
125533268
172
USER C
118654579
...
...

FIG.14

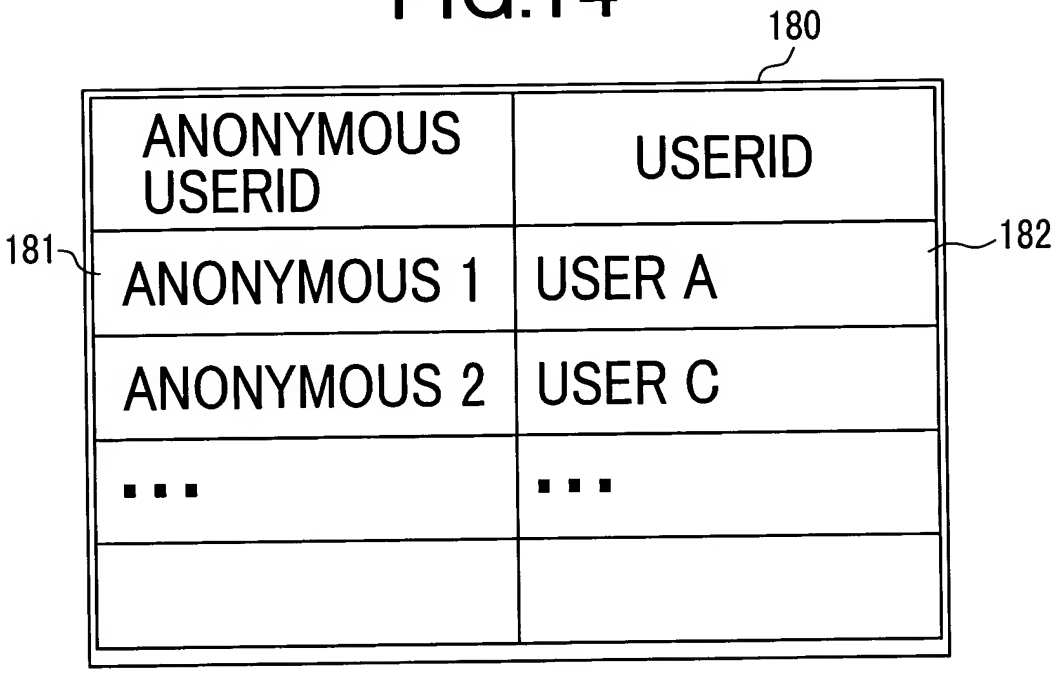

180
ANONYMOUS USERID
USERID
181
182
ANONYMOUS 1
USER A
ANONYMOUS 2
USER C

FIG.15

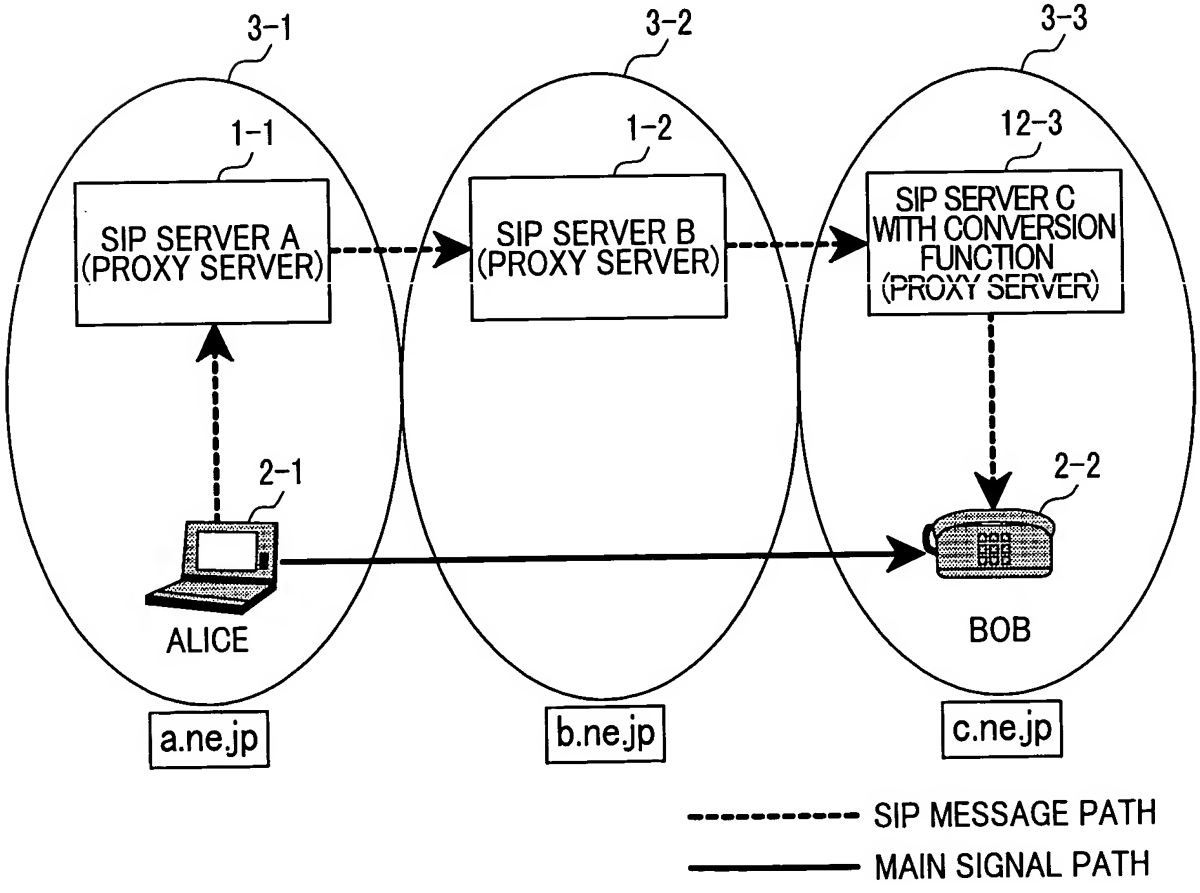

3-1
3-2
3-3
1-1
1-2
12-3
SIP SERVER A (PROXY SERVER)
SIP SERVER B (PROXY SERVER)
SIP SERVER C WITH CONVERSION FUNCTION (PROXY SERVER)
2-1
2-2
ALICE
BOB
a.ne.jp
b.ne.jp
c.ne.jp
SIP MESSAGE PATH
MAIN SIGNAL PATH

FIG.16

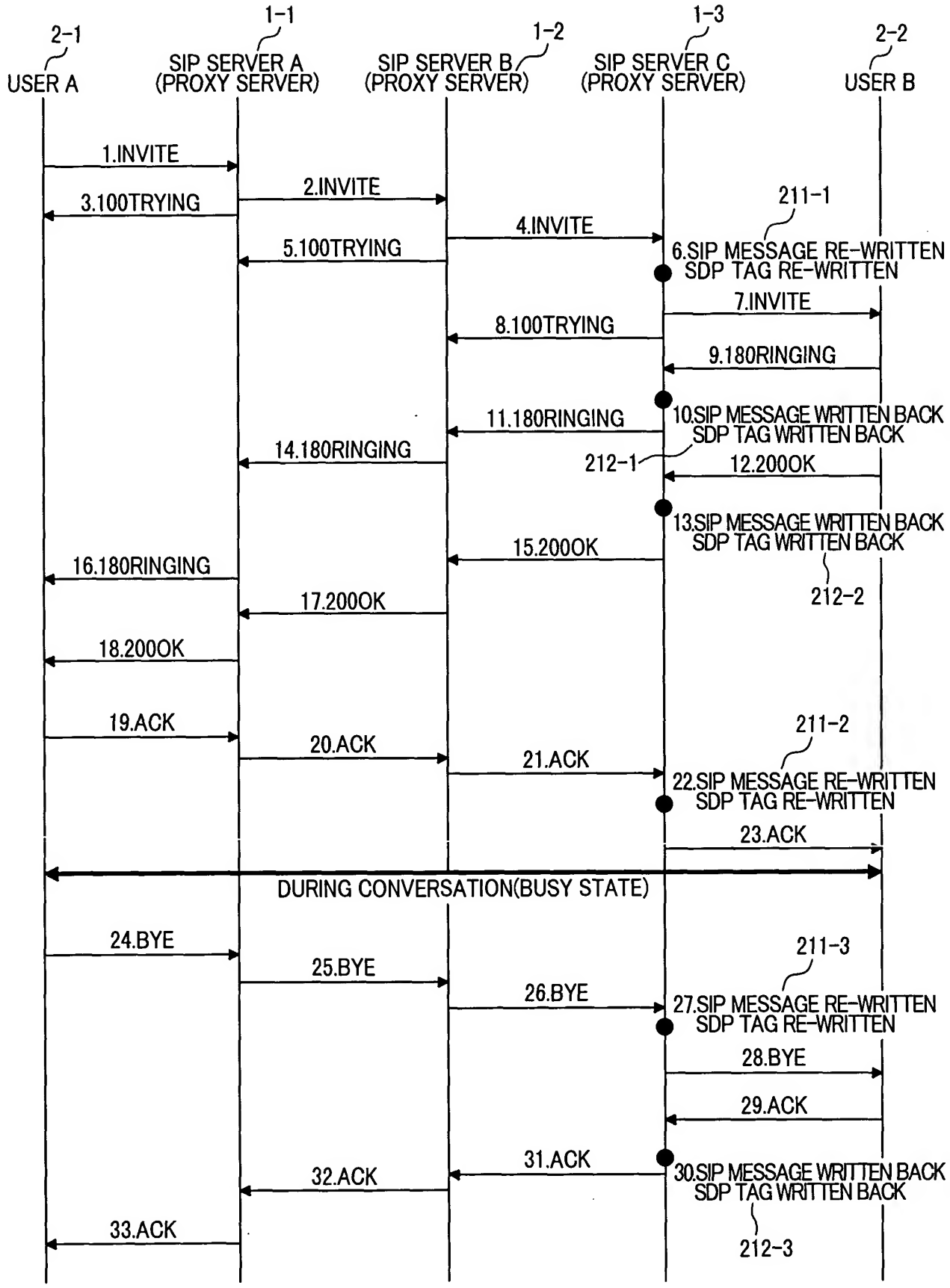

2-1
USER A
1-1
SIP SERVER A
(PROXY SERVER)
1-2
SIP SERVER B
(PROXY SERVER)
1-3
SIP SERVER C
(PROXY SERVER)
2-2
USER B
1.INVITE
2.INVITE
3.100TRYING
4.INVITE
211-1
5.100TRYING
6.SIP MESSAGE RE-WRITTEN
SDP TAG RE-WRITTEN
7.INVITE
8.100TRYING
9.180RINGING
10.SIP MESSAGE WRITTEN BACK
SDP TAG WRITTEN BACK
11.180RINGING
14.180RINGING
212-1
12.200OK
13.SIP MESSAGE WRITTEN BACK
SDP TAG WRITTEN BACK
15.200OK
16.180RINGING
212-2
17.200OK
18.200OK
19.ACK
211-2
20.ACK
21.ACK
22.SIP MESSAGE RE-WRITTEN
SDP TAG RE-WRITTEN
23.ACK
DURING CONVERSATION(BUSY STATE)
24.BYE
211-3
25.BYE
26.BYE
27.SIP MESSAGE RE-WRITTEN
SDP TAG RE-WRITTEN
28.BYE
29.ACK
31.ACK
30.SIP MESSAGE WRITTEN BACK
SDP TAG WRITTEN BACK
32.ACK
33.ACK
212-3

FIG.17

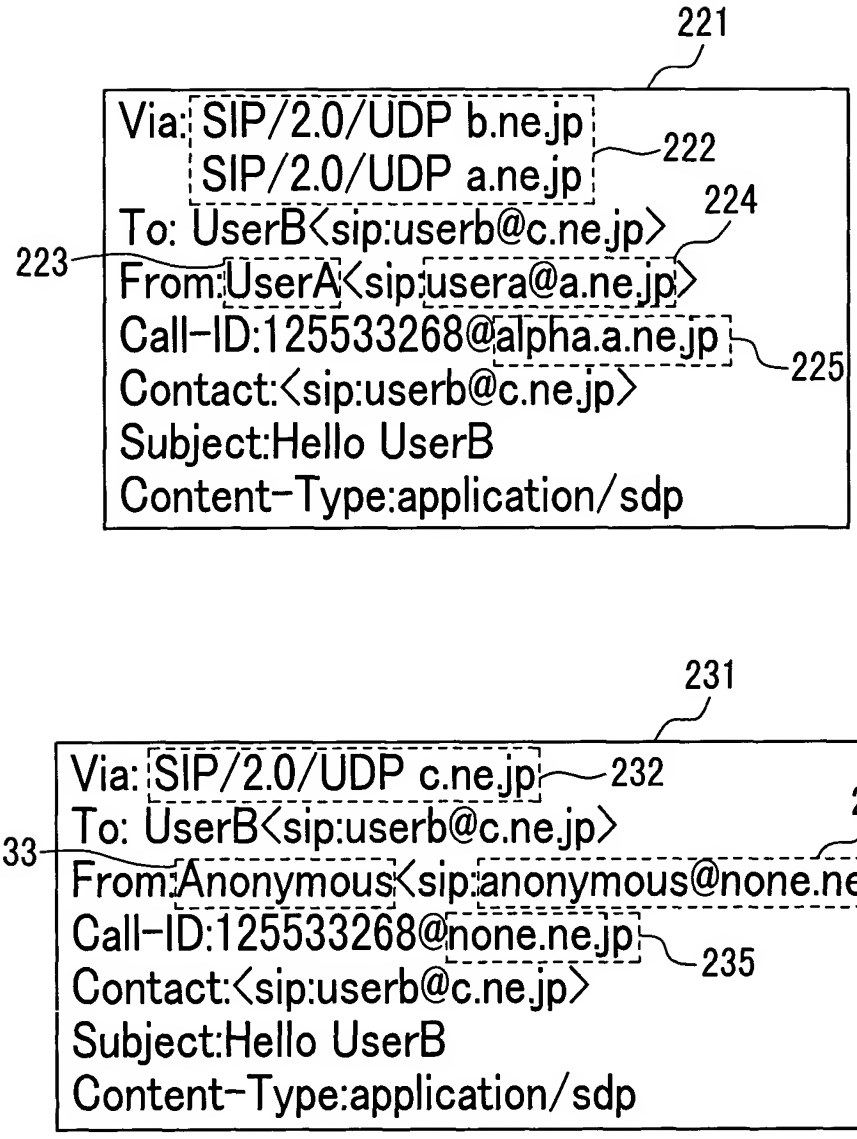

221
Via: SIP/2.0/UDP b.ne.jp
SIP/2.0/UDP a.ne.jp
222
To: UserB<sip:userb@c.ne.jp>
224
223
From:UserA<sip:usera@a.ne.jp>
Call-ID:125533268@alpha.a.ne.jp
225
Contact:<sip:userb@c.ne.jp>
Subject:Hello UserB
Content-Type:application/sdp
231
Via: SIP/2.0/UDP c.ne.jp
232
To: UserB<sip:userb@c.ne.jp>
234
233
From:Anonymous<sip:anonymous@none.ne.jp>
Call-ID:125533268@none.ne.jp
235
Contact:<sip:userb@c.ne.jp>
Subject:Hello UserB
Content-Type:application/sdp

FIG.18

271 USERID	272 CALL-ID	273 DOMAINID	274
USER A	125533268		
USER C	118654579		
...	...		

FIG.19

281 ANONYMOUS USERID	282 USERID	283 DOMAINID	284
ANONYMOUS 1	USER A		
ANONYMOUS 2	USER C		
...	...		

FIG.20

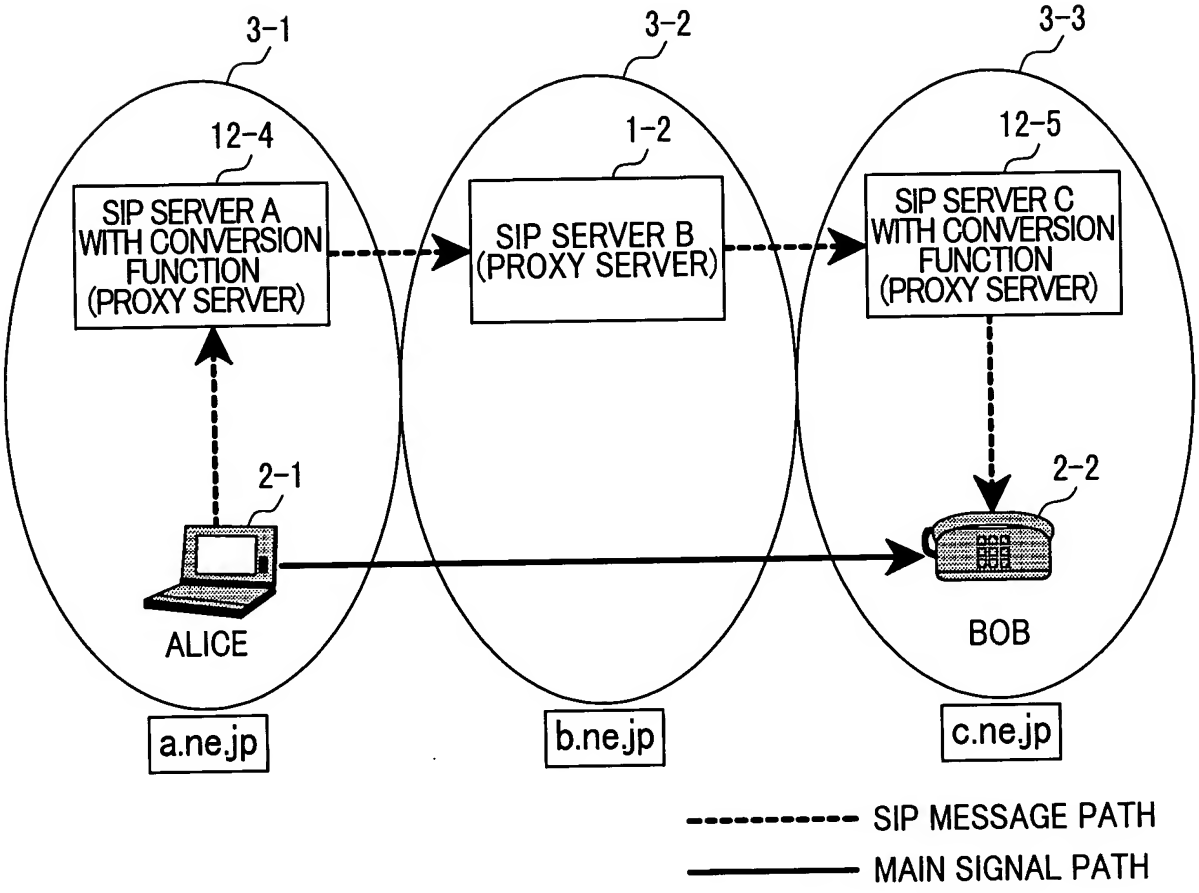

3-1
3-2
3-3
12-4
1-2
12-5
SIP SERVER A WITH CONVERSION FUNCTION (PROXY SERVER)
SIP SERVER B (PROXY SERVER)
SIP SERVER C WITH CONVERSION FUNCTION (PROXY SERVER)
2-1
2-2
ALICE
BOB
a.ne.jp
b.ne.jp
c.ne.jp
SIP MESSAGE PATH
MAIN SIGNAL PATH

FIG.21

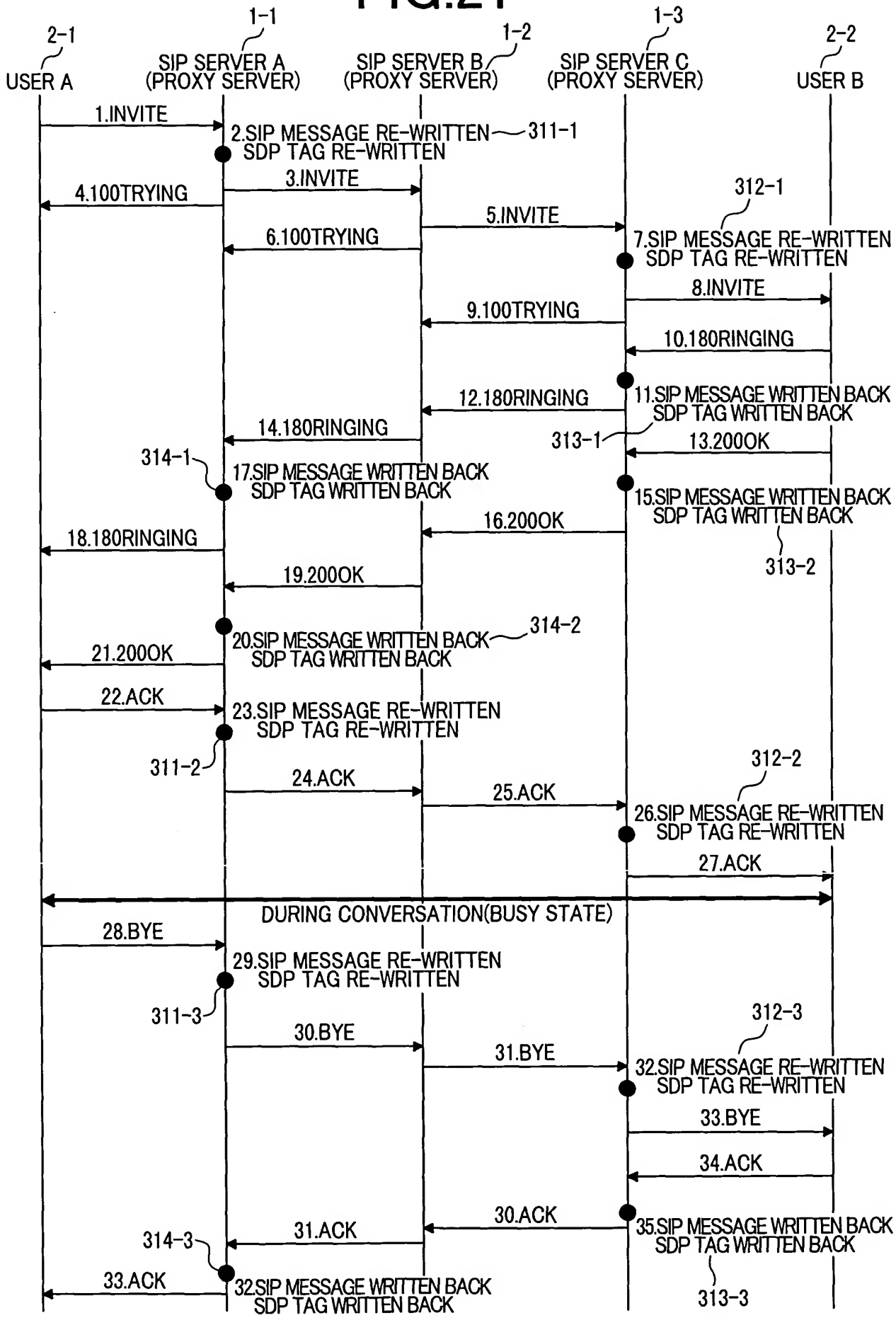

2-1
USER A
1-1
SIP SERVER A
(PROXY SERVER)
1-2
SIP SERVER B
(PROXY SERVER)
1-3
SIP SERVER C
(PROXY SERVER)
2-2
USER B
1.INVITE
2.SIP MESSAGE RE-WRITTEN
SDP TAG RE-WRITTEN
311-1
3.INVITE
4.100TRYING
5.INVITE
312-1
6.100TRYING
7.SIP MESSAGE RE-WRITTEN
SDP TAG RE-WRITTEN
8.INVITE
9.100TRYING
10.180RINGING
12.180RINGING
11.SIP MESSAGE WRITTEN BACK
SDP TAG WRITTEN BACK
14.180RINGING
313-1
13.200OK
314-1
17.SIP MESSAGE WRITTEN BACK
SDP TAG WRITTEN BACK
15.SIP MESSAGE WRITTEN BACK
SDP TAG WRITTEN BACK
16.200OK
18.180RINGING
313-2
19.200OK
20.SIP MESSAGE WRITTEN BACK
SDP TAG WRITTEN BACK
314-2
21.200OK
22.ACK
23.SIP MESSAGE RE-WRITTEN
SDP TAG RE-WRITTEN
311-2
312-2
24.ACK
25.ACK
26.SIP MESSAGE RE-WRITTEN
SDP TAG RE-WRITTEN
27.ACK
DURING CONVERSATION(BUSY STATE)
28.BYE
29.SIP MESSAGE RE-WRITTEN
SDP TAG RE-WRITTEN
311-3
312-3
30.BYE
31.BYE
32.SIP MESSAGE RE-WRITTEN
SDP TAG RE-WRITTEN
33.BYE
34.ACK
30.ACK
31.ACK
35.SIP MESSAGE WRITTEN BACK
SDP TAG WRITTEN BACK
314-3
33.ACK
32.SIP MESSAGE WRITTEN BACK
SDP TAG WRITTEN BACK
313-3

FIG.22

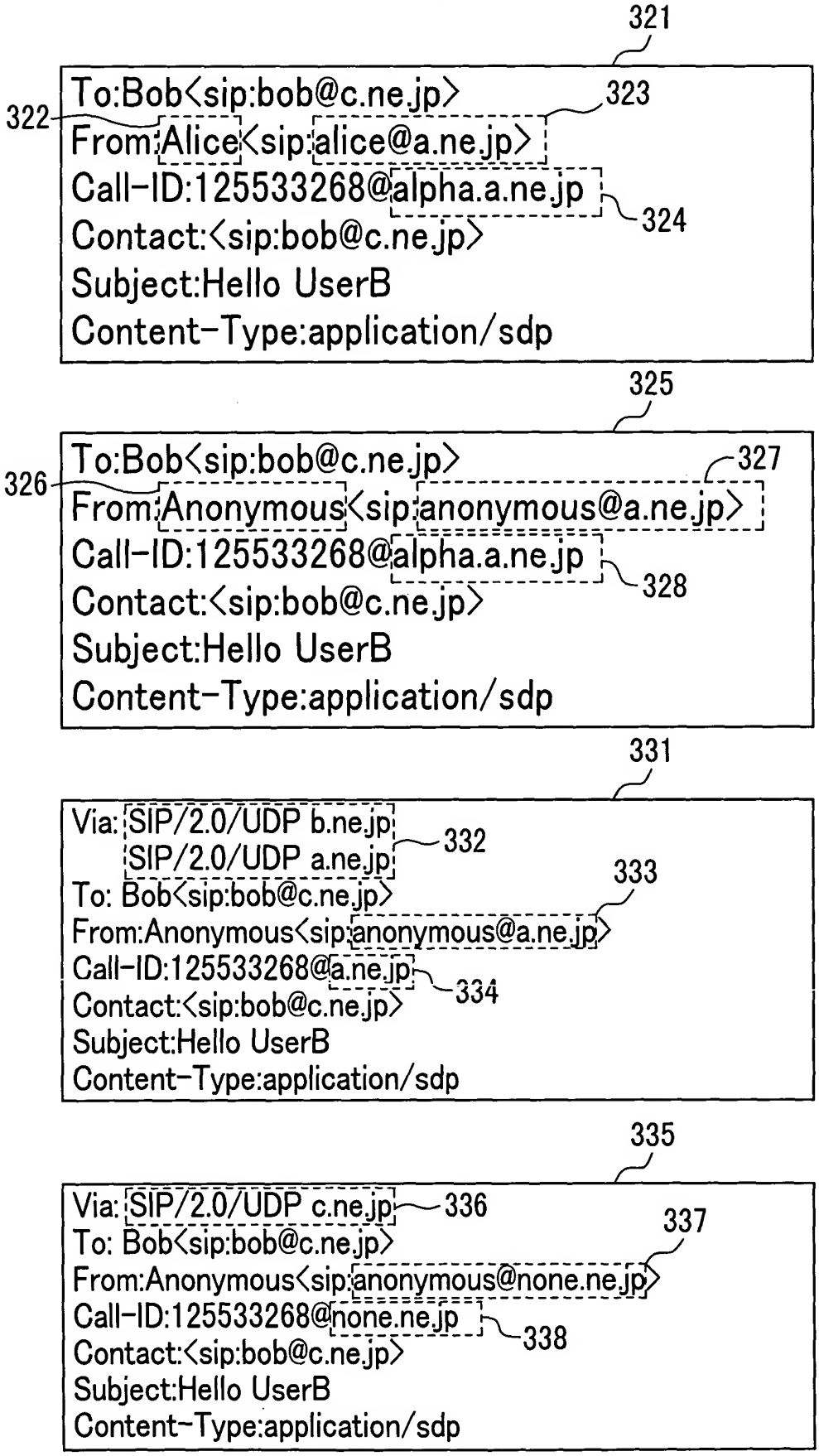

321
To:Bob<sip:bob@c.ne.jp>
323
322
From:Alice<sip:alice@a.ne.jp>
Call-ID:125533268@alpha.a.ne.jp
324
Contact:<sip:bob@c.ne.jp>
Subject:Hello UserB
Content-Type:application/sdp
325
To:Bob<sip:bob@c.ne.jp>
327
326
From:Anonymous<sip:anonymous@a.ne.jp>
Call-ID:125533268@alpha.a.ne.jp
328
Contact:<sip:bob@c.ne.jp>
Subject:Hello UserB
Content-Type:application/sdp
331
Via: SIP/2.0/UDP b.ne.jp
SIP/2.0/UDP a.ne.jp
332
333
To: Bob<sip:bob@c.ne.jp>
From:Anonymous<sip:anonymous@a.ne.jp>
Call-ID:125533268@a.ne.jp
334
Contact:<sip:bob@c.ne.jp>
Subject:Hello UserB
Content-Type:application/sdp
335
Via: SIP/2.0/UDP c.ne.jp
336
337
To: Bob<sip:bob@c.ne.jp>
From:Anonymous<sip:anonymous@none.ne.jp>
Call-ID:125533268@none.ne.jp
338
Contact:<sip:bob@c.ne.jp>
Subject:Hello UserB
Content-Type:application/sdp

FIG.23

341 342 343

USERID	CALL-ID
USER A	125533268
USER C	118654579
...	...

351 352 353 354

ANONYMOUS USERID	USERID
ANONYMOUS 1	USER A
ANONYMOUS 2	USER C
...	...

FIG.24

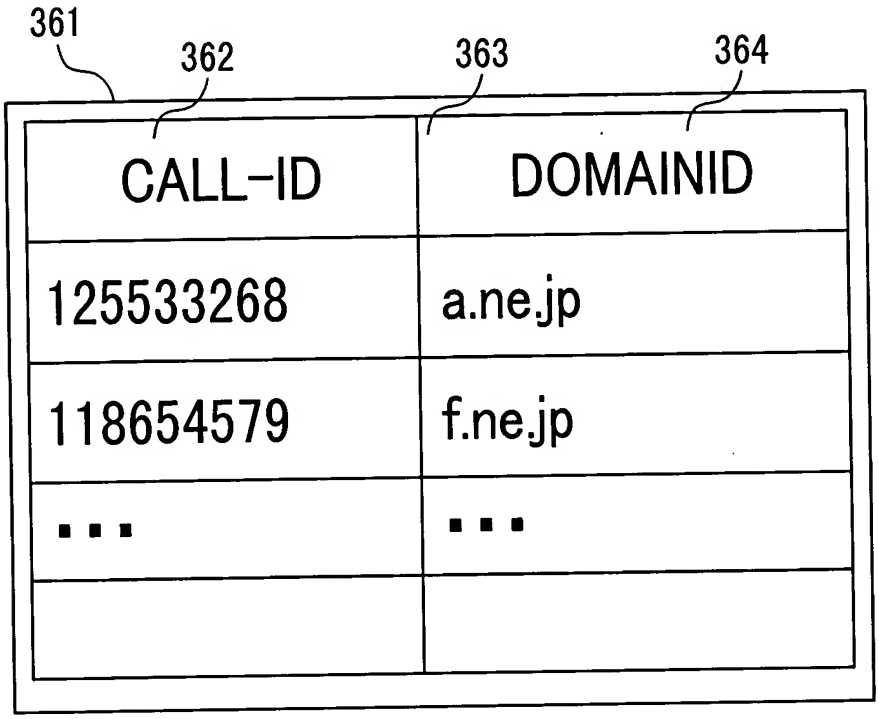

361
362
363
364
CALL-ID
DOMAINID
125533268
a.ne.jp
118654579
f.ne.jp
...
...

FIG.25

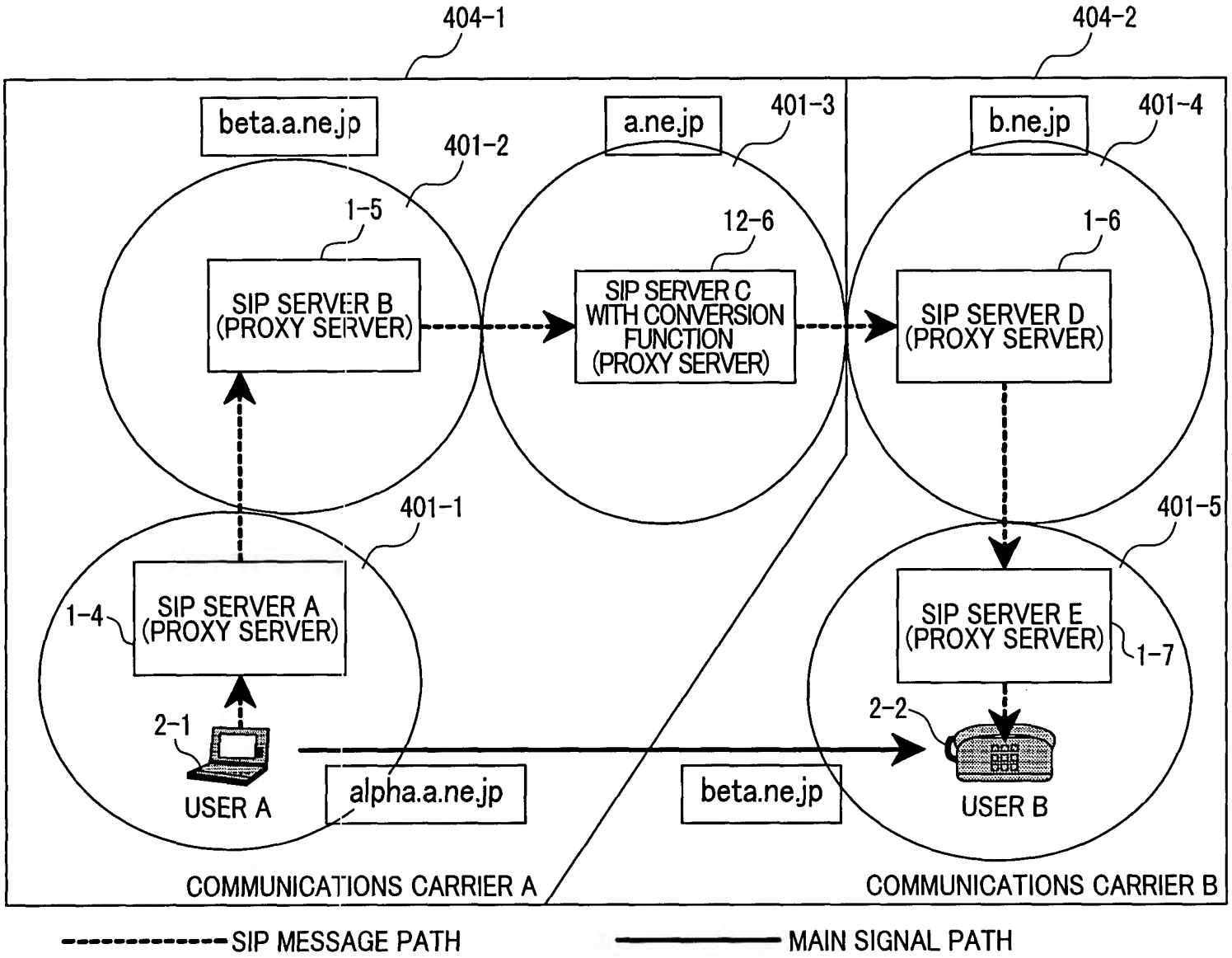

404-1
404-2
beta.a.ne.jp
a.ne.jp
b.ne.jp
401-2
401-3
401-4
1-5
12-6
1-6
SIP SERVER B
(PROXY SERVER)
SIP SERVER C
WITH CONVERSION
FUNCTION
(PROXY SERVER)
SIP SERVER D
(PROXY SERVER)
401-1
401-5
1-4
SIP SERVER A
(PROXY SERVER)
SIP SERVER E
(PROXY SERVER)
1-7
2-1
2-2
USER A
alpha.a.ne.jp
beta.ne.jp
USER B
COMMUNICATIONS CARRIER A
COMMUNICATIONS CARRIER B
SIP MESSAGE PATH
MAIN SIGNAL PATH

FIG.26

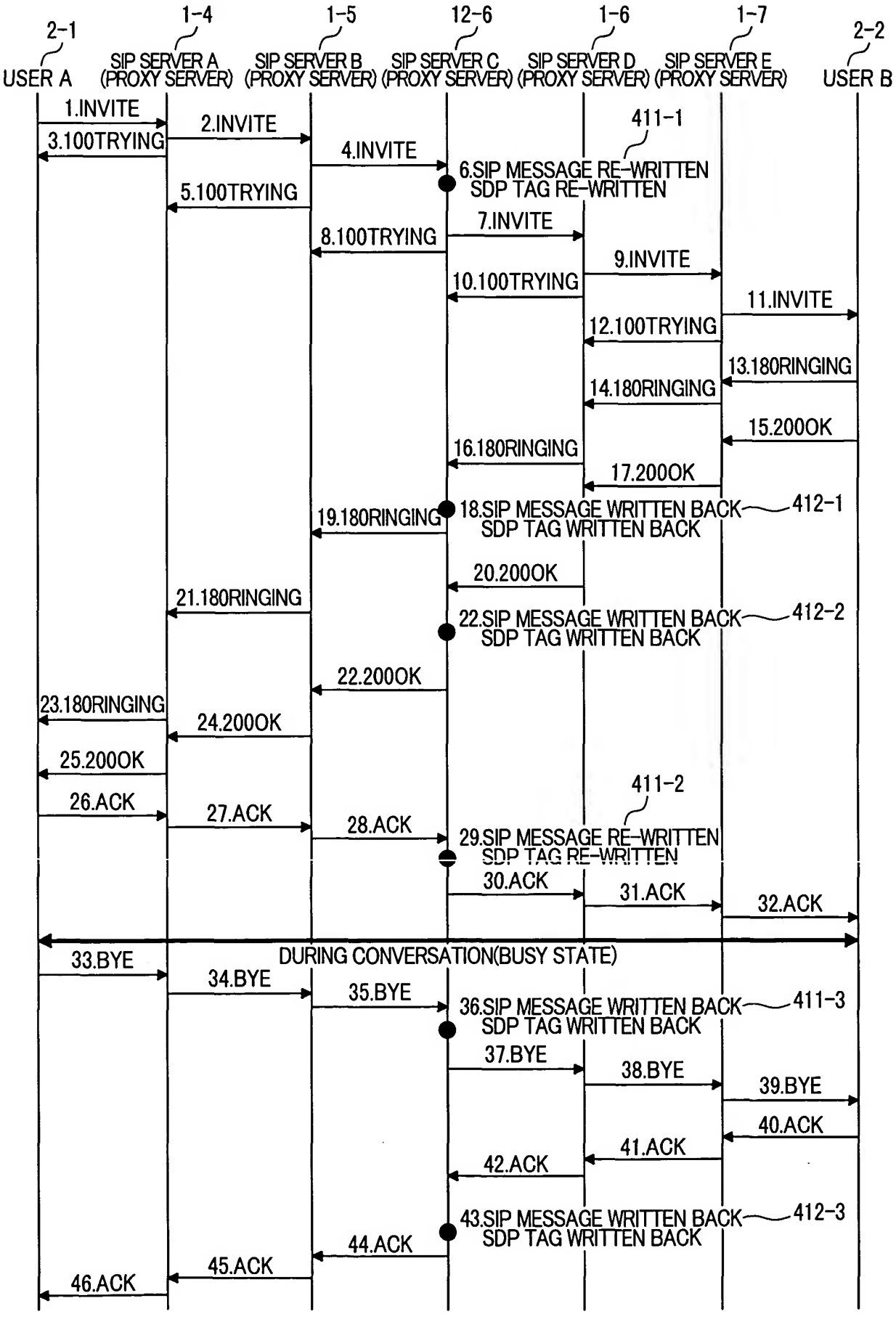
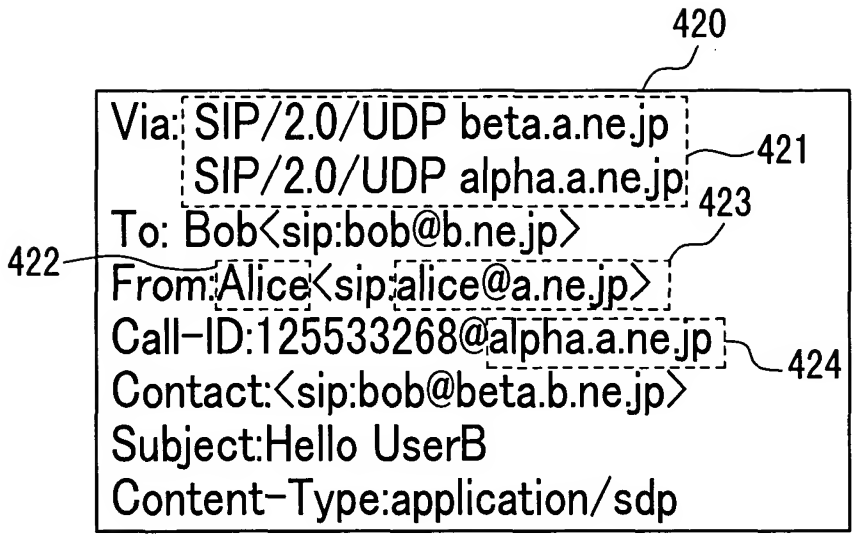

2-1
USER A
1-4
SIP SERVER A (PROXY SERVER)
1-5
SIP SERVER B (PROXY SERVER)
12-6
SIP SERVER C (PROXY SERVER)
1-6
SIP SERVER D (PROXY SERVER)
1-7
SIP SERVER E (PROXY SERVER)
2-2
USER B
1.INVITE
2.INVITE
3.100TRYING
4.INVITE
411-1
6.SIP MESSAGE RE-WRITTEN
SDP TAG RE-WRITTEN
5.100TRYING
7.INVITE
8.100TRYING
9.INVITE
10.100TRYING
11.INVITE
12.100TRYING
13.180RINGING
14.180RINGING
15.200OK
16.180RINGING
17.200OK
18.SIP MESSAGE WRITTEN BACK
SDP TAG WRITTEN BACK
412-1
19.180RINGING
20.200OK
21.180RINGING
22.SIP MESSAGE WRITTEN BACK
SDP TAG WRITTEN BACK
412-2
22.200OK
23.180RINGING
24.200OK
25.200OK
411-2
26.ACK
27.ACK
28.ACK
29.SIP MESSAGE RE-WRITTEN
SDP TAG RE-WRITTEN
30.ACK
31.ACK
32.ACK
DURING CONVERSATION(BUSY STATE)
33.BYE
34.BYE
35.BYE
36.SIP MESSAGE WRITTEN BACK
SDP TAG WRITTEN BACK
411-3
37.BYE
38.BYE
39.BYE
40.ACK
41.ACK
42.ACK
43.SIP MESSAGE WRITTEN BACK
SDP TAG WRITTEN BACK
412-3
44.ACK
45.ACK
46.ACK

FIG.27


420
Via: SIP/2.0/UDP beta.a.ne.jp
SIP/2.0/UDP alpha.a.ne.jp
421
To: Bob<sip:bob@b.ne.jp>
423
422
From: Alice<sip:alice@a.ne.jp>
Call-ID:125533268@alpha.a.ne.jp
424
Contact:<sip:bob@beta.b.ne.jp>
Subject:Hello UserB
Content-Type:application/sdp

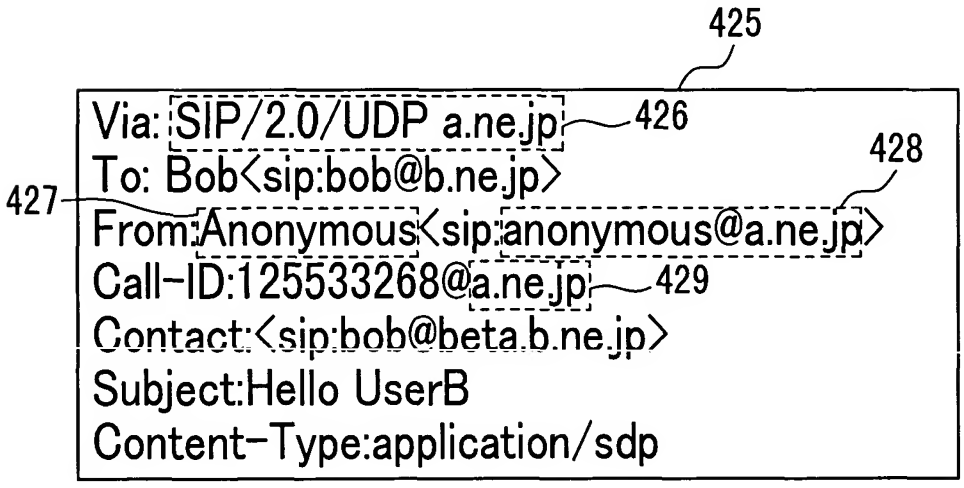

425
Via: SIP/2.0/UDP a.ne.jp
426
428
To: Bob<sip:bob@b.ne.jp>
427
From: Anonymous<sip:anonymous@a.ne.jp>
Call-ID:125533268@a.ne.jp
429
Contact:<sip:bob@beta.b.ne.jp>
Subject:Hello UserB
Content-Type:application/sdp

FIG.28

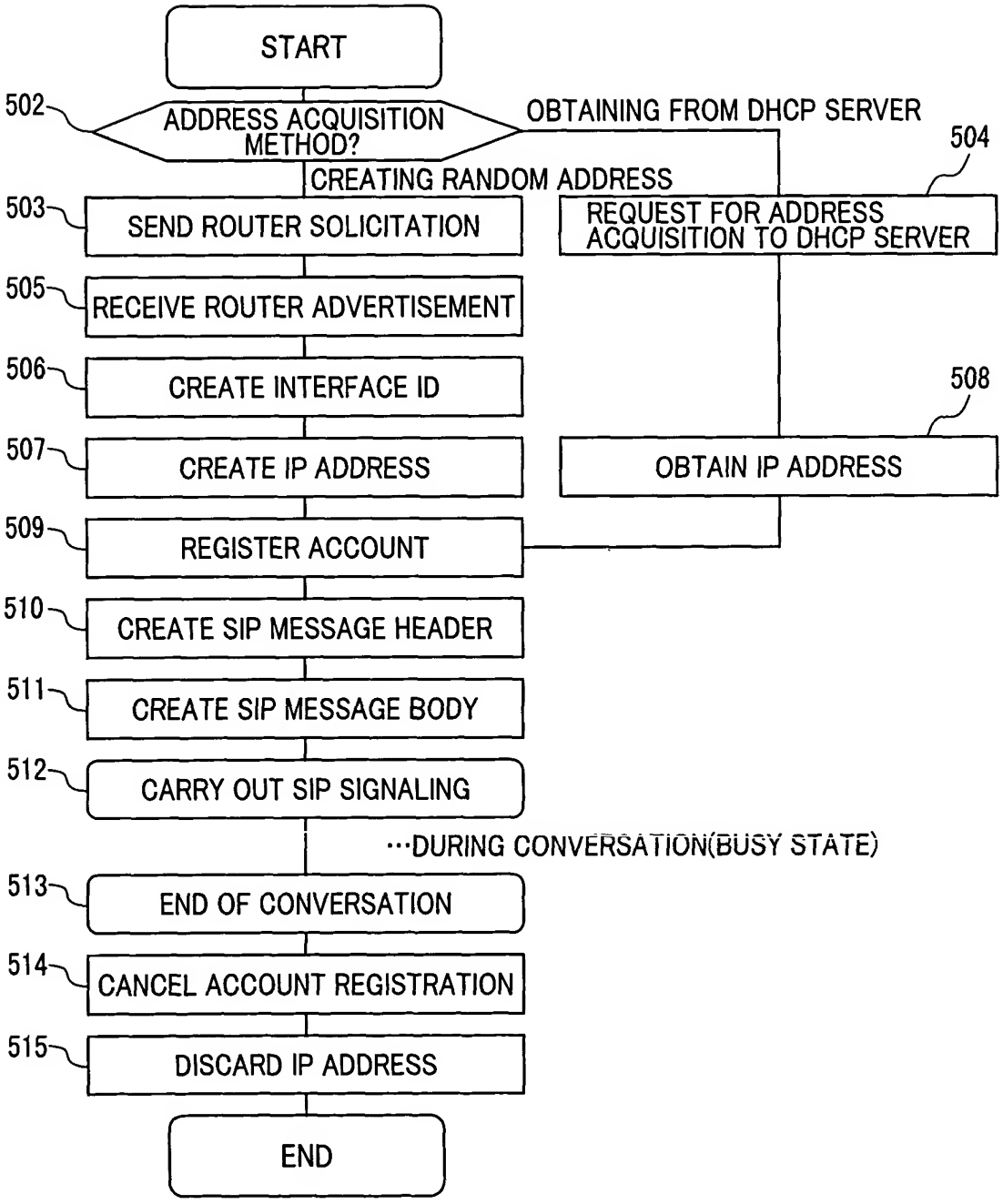

START
502
ADDRESS ACQUISITION METHOD?
OBTAINING FROM DHCP SERVER
504
CREATING RANDOM ADDRESS
503
SEND ROUTER SOLICITATION
REQUEST FOR ADDRESS ACQUISITION TO DHCP SERVER
505
RECEIVE ROUTER ADVERTISEMENT
506
CREATE INTERFACE ID
508
507
CREATE IP ADDRESS
OBTAIN IP ADDRESS
509
REGISTER ACCOUNT
510
CREATE SIP MESSAGE HEADER
511
CREATE SIP MESSAGE BODY
512
CARRY OUT SIP SIGNALING
…DURING CONVERSATION(BUSY STATE)
513
END OF CONVERSATION
514
CANCEL ACCOUNT REGISTRATION
515
DISCARD IP ADDRESS
END

FIG.29

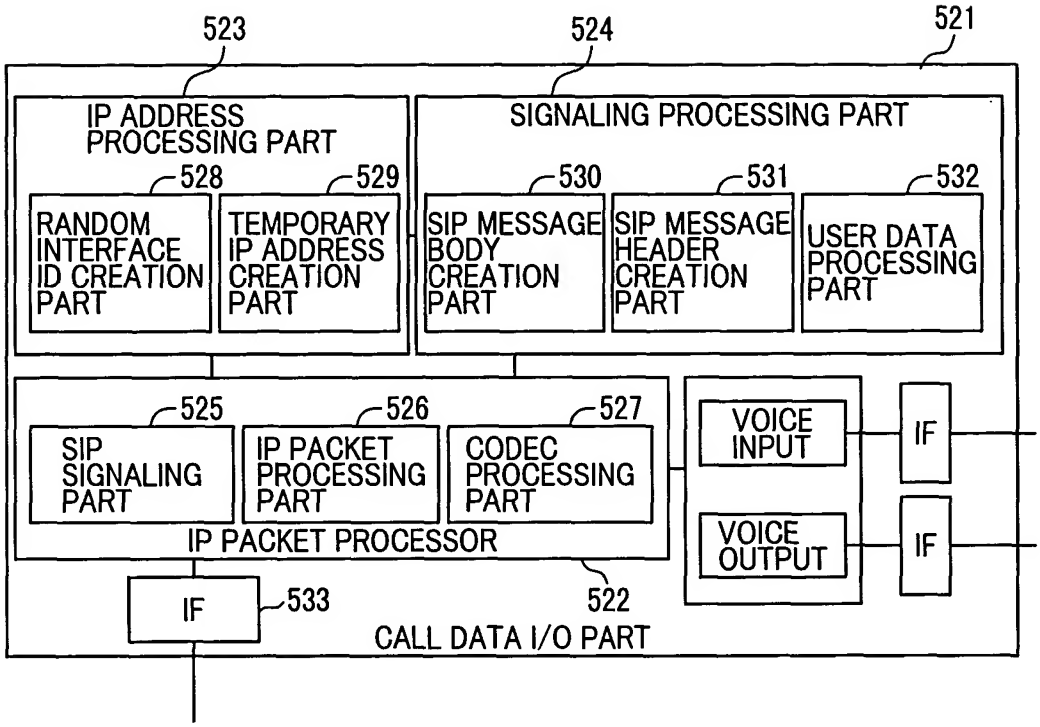

523
524
521
IP ADDRESS PROCESSING PART
528
529
RANDOM INTERFACE ID CREATION PART
TEMPORARY IP ADDRESS CREATION PART
SIGNALING PROCESSING PART
530
531
532
SIP MESSAGE BODY CREATION PART
SIP MESSAGE HEADER CREATION PART
USER DATA PROCESSING PART
525
526
527
SIP SIGNALING PART
IP PACKET PROCESSING PART
CODEC PROCESSING PART
IP PACKET PROCESSOR
VOICE INPUT
VOICE OUTPUT
IF
IF
IF
533
522
CALL DATA I/O PART

FIG.30

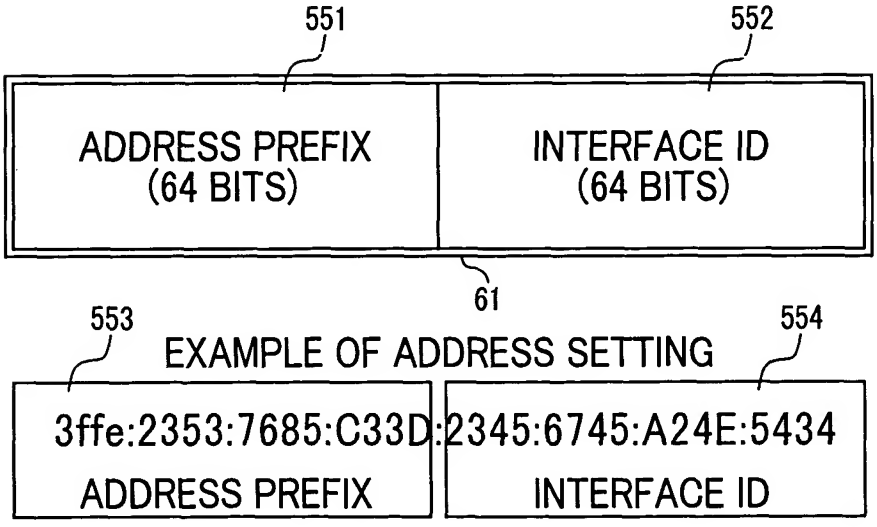
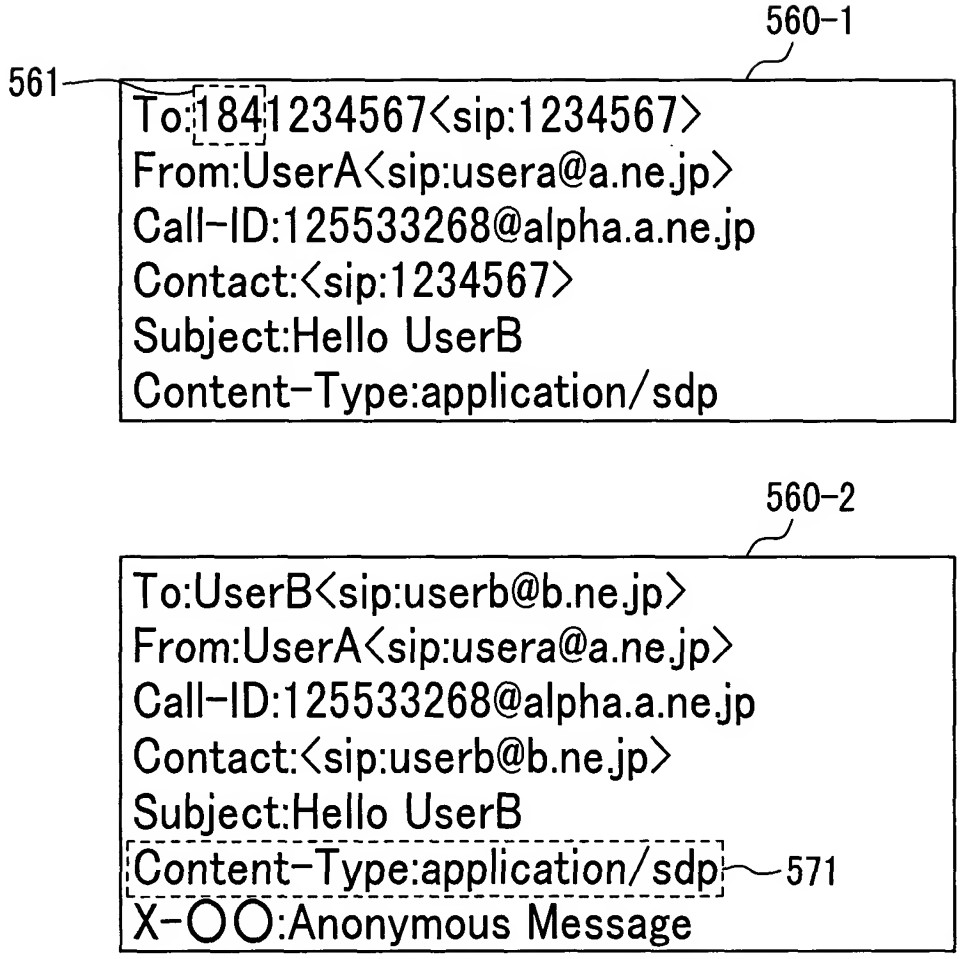

551
552
ADDRESS PREFIX (64 BITS)
INTERFACE ID (64 BITS)
61
553
554
EXAMPLE OF ADDRESS SETTING
3ffe:2353:7685:C33D:2345:6745:A24E:5434
ADDRESS PREFIX
INTERFACE ID

FIG.31


560-1
561
To:1841234567<sip:1234567>
From:UserA<sip:usera@a.ne.jp>
Call-ID:125533268@alpha.a.ne.jp
Contact:<sip:1234567>
Subject:Hello UserB
Content-Type:application/sdp
560-2
To:UserB<sip:userb@b.ne.jp>
From:UserA<sip:usera@a.ne.jp>
Call-ID:125533268@alpha.a.ne.jp
Contact:<sip:userb@b.ne.jp>
Subject:Hello UserB
Content-Type:application/sdp
571
X-○○:Anonymous Message